

NATURE NOTES.

Those of us who live within half a day's journey of London have good opportunities of studying the physical features and flora of the cretaceous and tertiary periods. Should our way lead us over the Downs above Brighton, or the hills of Reigate or Dorking, we shall be able to recognise by the white chalk beneath our feet that we are walking over land laid down under deep-sea conditions in bygone ages. Standing on the Devil's Dyke at Brighton, or on the summit of Boxhill at Dorking, we are indeed standing on the edge of the chalk escarpment, scarcely touched by the weathering agents which have worn away the intervening portion between these two points.

This land between the two escarpments is formed of those greensands and gaults which were laid down in shallow water before the land had subsided sufficiently to be covered by water deep enough to support the life of those innumerable living organisms, whose remains form the chalk. The chalk rolls smoothly away at the top of the hill, having been thus levelled by the action of the waves.

On examining one of the numerous chalk-pits, to be found on the sides of the escarpment, we find quantities of flints, formed by the deposition of silica in and around sponges, shells, &c. It is possible to find a flint with the mould of the ancient sponge inside it. We may also find fossil shells of numerous bivalve, besides sea-urchins, &c. If we are lucky we may find what is commonly called by the quarrymen a "slug," being really the bony corrugated roof-plate of a cretaceous fish which lived on shell-fish, and crunched them up by means of this bony roof-plate; or we may find the tooth of a shark, or a belemnite, that is the shell of a cretaceous cephalopod, a kind of cuttle-fish. This creature had its shell or guard inside its soft body, its head was surrounded with tentacles or feelers, by means of which it moved about or seized its prey, and it was provided with an ink bag for defensive purposes like the modern cuttle-fish. We may also find the curious spiral shell of an ammonite,

another cretaceous cephalopod, a creature which resembled the modern nautilus, and had a shell divided into chambers by transverse partitions, the animal inhabiting the last and largest one. What are believed by the quarrymen to be thunderbolts are really radiated deposits of iron pyrites formed round a vegetable nucleus. If we turn our attention to the surface, we shall find a rich and numerous flora. The rock rose (*Helianthemum vulgare*) is common on the chalk, though rare elsewhere. Orchids are well represented. In the spring we get early purple (*O. muscula*), hand-spotted (*orchis masculata*), dwarf (*O. ustulata*). Then later, the bee (*ophrys apifera*), butterfly (*habenaria bifolia*), fly (*ophrys muscifera*), spider orchis (*ophrys aranifera*), twayblade (*listera ovata*), and bird's nest (*neottia nidus-avis*). In July we get pyramid orchis (*pyramidalis*) and helleborine. The Gentian Family is represented by the yellow ort (*chlora perfoliata*), and the common pink centaury (*erythraea centaurium*).

Poppies are numerous. We distinguish field poppy (*papaver rhoeas*), pale poppy (*P. argemone*), and yellowhorn or sea poppy (*glaucium luteum*), by the seaside, with its curious long twisted ovaries, which give it the name of sea cucumber also, and the rough poppy (*papaver hybridum*), with small carmine-coloured petals and round rough seed-vessels.

The members of the Composite Family are very numerous. The star thistle (*centaurea calcitrapa*) is one of the rarities of this order. It has a beautiful appearance, its calyx forming a thorny star round the little thistle-like flower. The beautiful blue chicory (*cichorium intybus*), the cornflower (*centaurea cyanus*), and knapweeds (*centaurea*). Fleabane (*inula*) and ragworts (*senecis*) abound. There is also the round-headed rampion (*phylisma orbiculare*), a pretty little flower belonging to the campanulaceæ, whose acquaintance I first made in Switzerland, and of course quantities of its near relative, the dainty harebell (*campanula rotundifolia*).

This is but a slight enumeration of the many flowers to be found on the chalk.

Leaving the chalk hills we descend into the open plain, which once lay hidden beneath a great chalk mountain that joined and rose above the two escarpments of the North and South Downs before mentioned. The plain rolls away in

gentle undulations covered with fine forest and glorious woodland. Here we find hard sandstones, from which we get our hearthstones, softer sandstones from which "Fuller's Earth" is made (Sandgate Beds). These are called the greensands, and with them we get layers of clay. The thickest of these layers separating the upper and lower greensand is called gault. In these deposits, the fossils, we find, are much the same as in the chalk, as they were laid down in sea water, although shallow, instead of deep, but we find no ammonites, because they died out during this period. Beneath the greensands and gault, and still belonging to the chalk period, we get more sandy and clayey beds called the Wealden-strata, only differing from those above, because we can tell from their fossils that they were deposited in fresh water. Amongst them we get many remains of fir trees and ferns and fresh water shellfish. There are also beds of "ironstone," which were extensively mined and smelted before the coal and ironstones of the North were exploited. Let us take a walk through the picturesque scenery of the Ashdown Forest, a neighbourhood which should be doubly interesting to us, for here Charles Darwin studied Nature much. We start from the little wayside station of West Hoathly and walk across a breezy common, and through the beautiful forest to East Grinstead. We find quantities of heather and fern, two things which we never meet with on the chalk. We pass on our way one or two of the ponds which are so common in this neighbourhood. They are all artificial, having been made in order to carry on the iron smelting of former times, and they are all called "furnace ponds," or something similar, the furnaces having been of charcoal provided by the surrounding forest. The last furnace was blown out at "Ashburnham" in 1828. In Chichester Cathedral the doors of the Lady Chapel are of hammered ironwork, made from this charcoal-smelted iron. In these ponds we find abundance of water buttercup (*R. aquatilis*), with its two kinds of leaves, the much-dissected and submerged, which takes its form in order that the plant may obtain its nourishment from the water more easily, and the entire floating kind. It is remarkable that if a floating leaf becomes partly submerged, the submerged parts become dissected, showing an interesting transition stage. We shall also find many rushes and the water

plantain (*Alisma plantago*), the handsome arrowhead (*Sagittaria sagittifolia*), with its white unisexual flowers. Water lilies, too, grow in some of the ponds. A locally common, but elsewhere somewhat rare plant, is the grass-leaved vetch (*Lathyrus nissolia*), and at one part of the forest we may find an old Ambleside friend, the Stag's Horn Moss, a very rare treasure in these parts.

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CHARLES LAMB.

Charles Lamb was born in 1775 in the Temple. In 1796 he came of age. He was at this time in love, and was unfortunately crossed in it. His essay on "Dream Children," a Reverie, refers to this period of his life, and his trouble so took hold upon him that for a time he became insane. In due course he recovered, but only, as it were, to become conscious of fresh trouble, for his sister, to whom he was much attached, became suddenly insane, killing her mother and injuring her father. She was of course removed from her home. When she recovered from the attack her brother, who had sorely missed her, and who could not bear the idea of her being always under restraint, begged that she might return to her home, and he would keep watch over her. In reading of this period of Lamb's life, one is moved to great admiration of him, for he voluntarily took upon himself a very difficult task.

It was not the performing of an uncongenial duty once and for all, but the doing of it day after day for years. In Lamb's case it meant endless sorrow in seeing a dearly-loved one so sadly afflicted, and ceaseless anxiety, not knowing when an outbreak might appear; and as time went on the attacks became more frequent, and each of longer duration than the last. Often he and his sister were driven from place to place, for those with whom they had lodged but a short time, hearing of the sad tragedy in their lives, would entertain objections against them, and Lamb and his sister would feel obliged to seek a fresh home, if such it could be